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REMARKS

Claims 18, 19, 20 and 22 have been amended. Claims 2-16, 18-22, and 24-30 are pending and under consideration in the application.

Claims 18, 19, 20 and 22 have been amended to specify that the two different types of reactive end-groups on the dendritic polymers used to prepare the claimed cross-linked compound can either be unreacted (and hence reactive) or reacted (such as with the succinimidyl compounds shown in Fig. 3) in the claimed cross-linked product. This amendment is necessary to broaden the scope of the claims to encompass the situation when all of at least one of the two end-groups is completely reacted (as described in paragraph 20 of the specification).

Rejection Under 35 U.S.C. §112

Claims 2-12, 19-22, and 24-30 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite and confusing for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Examiner appears to have taken the position that claim 19 does not encompass intermolecularly cross-linked dendrimer moieties, but instead claims only a single dendrimer that is not cross-linked to the other dendrimers. This, however, is inconsistent with the plain language of the claim which requires that "dendritic polymer moieties [are] linked to one another by a moiety having alternating conjugated double and triple bonds." Each of the elements of Figure 2 labeled as a "Dendrimer" is a part or "moiety" of a single cross-linked molecule as claimed. The expression "compound" in claim 19 encompasses a single cross-linked molecule such as is shown in Figure 2, i.e., a molecule that is, for example, formed by cross-linking of diacetylene functional groups that are part of a chemical moiety bonded to a dendritic polymer. Therefore, the molecule of Figure 2 includes a central dendritic polymer moiety linked to three other dendritic polymer moieties by alternating conjugated double and triple bonds, consistent with the language of claim 19.

The Examiner has stated that some of the dendrimers (which are actually dendritic polymer moieties of a larger cross-linked molecule after they have reacted) contain sensory groups, while others do not. This is correct. Figure 2 shows that the central dendritic

polymer moiety in the illustrated cross-linked compound does not have any attached sensory groups, whereas the three other dendritic polymer moieties have attached sensory groups. However, claim 19 does not require that every dendritic polymer moiety has a sensory group attached to it, but instead only requires that the entire compound has at least one sensory group.

The Examiner has stated that the claims do not require that the dendritic polymer moieties themselves contain any diacetylenic linkages as shown in the structures of Figures 3 and 4. This is correct. The claims do not require that the cross-linked compound of claim 19 has any residual unreacted diacetylenic linkages. However, it is not clear on what basis the Examiner believes that the claims should specify how many, if any, unreacted diacetylenic linkages remain after cross-linking.

The Examiner has stated that Applicants have remarked that the compound of claim 19 was meant to encompass the structure shown in Figure 2. This is correct. Applicant stated "Fig. 2 is a schematic representation of a compound comprising dendritic polymer moieties linked to one another by a moiety having alternating conjugated double and triple bonds, and at least one sensory group bonded to the compound."

The Examiner stated that claim 19 does not require any core dendrimer structure. This is correct. Claim 19 requires dendritic polymer moieties that are linked to one another by a moiety having alternating conjugated double and triple bonds. It would be inappropriate to regard any of the dendritic polymer moieties in the resulting cross-linked structure as a core, since reactions of the diacetylenic moieties occur rapidly and randomly, such that there is not highly ordered branching from a core unit.

The Examiner has further stated that claim 19 requires "at least two different types of reactive and-groups." This is correct.

The Examiner has stated that Figure 3 shows a dendritic polymer core. This is incorrect. Figure 3 shows a reaction between a dendritic polymer having two different types of reactive end-groups (hydroxyl and amine). The amine groups are reacted with a first molecule having an N-hydroxysuccinimidyl ester functional group that is reactive with the primary amines on the dendritic polymer and a sensory group, and a second molecule having an N-hydroxysuccinimidyl ester functional group and a diacetylenic moiety. The product of

the reaction is a dendrimer having hydroxyl groups, optional residual amine groups, pendent sensory groups, and pendant groups having diacetylenic moieties that are capable of reacting with other diacetylenic moieties, either on the same dendritic polymer molecule or on another dendritic polymer molecule. The product shown in Figure 3, upon exposure to suitable conditions, reacts via the mechanism shown in Figure 1 to form a cross-linked product schematically illustrated in Figure 2. It will be understood by those having ordinary skill in the art that Figure 2 is a conceptual representation of an actual cross-linked network, which for example can be a continuous film comprising billions of dendritic polymer moieties that are linked together in a three-dimensional network.

The Examiner stated that Figure 2 does not depict the dendritic polymer moieties having different reactive end-groups. This is correct. In order to simplify the illustration and facilitate understanding, the functional end-groups were not shown in Figure 2. However, the specification clearly indicates (paragraph 13) that Figure 3 is a schematic representation of a precursor to the network polymer sensor depicted in Figure 2, which has two different reactive end-groups (amine and hydroxyl).

It is respectfully submitted that the various observations made by the Examiner do not explain or support a rejection of the claims under 35 U.S.C. §112, second paragraph. It is hoped that the above discussion of the Examiner's observations has facilitated a better understanding of the claimed invention and persuaded the Examiner that the claim terminology is definite and appropriate. More specifically, it is more appropriate to refer to the portion of a cross-linked network which was originally a dendritic polymer as a dendritic polymer moiety rather than a dendritic polymer, since each of the original dendritic polymer molecules has become part of a larger cross-linked polymer network. The individual dendritic polymers no longer exist independently of the network. The Examiner's repeated reference to "dendritic polymer core" is difficult to comprehend in view of the fact that the specification does not describe the invention in terms of a "core," and none of the claims require a "dendritic polymer core." Finally, the objection to the expression "at least two different types of end-groups" appears to relate to a question as to whether the drawings show two different types of functional end-groups, not whether the expression is indefinite under 35 U.S.C. §112, second paragraph. Regardless, there is no support issue, since Figure 3 shows a dendrimer with two

different types of functional groups, and paragraph 13 indicates that the polymer of Figure 3, having two different types of functional groups, is a precursor to the cross-linked polymer network shown in Figure 2.

For the reasons set forth above, it is respectfully submitted that the claims as written meet the definiteness requirements of 35 U.S.C. §112, second paragraph. More specifically, the claim language is not ambiguous or vague so as to be subject to multiple interpretations.

Nonstatutory Double Patenting Rejection

Claims 2-12, 18-22, and 24-30 stand provisionally rejected on ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of copending application Serial No. 10/068,378. More specifically, the Examiner has stated that the claims are not patentably distinct from each other because claim 1 of application Serial No. 10/068,378 "appears to encompass the structures of claim 19 of 10/712,739." It is respectfully submitted that this rejection is inappropriate and inconsistent with the laws governing obviousness-type double patenting. Obviousness-type double patenting requires rejection of an application claim when the claimed subject matter is not patentably distinct from the subject matter claimed in a commonly owned patent when the issuance of a second patent would provide an unjustified extension of the term of the right to exclude granted by a patent. *See* M.P.E.P. §8.32(B)(1) *citing Eli Lilly & Co. v. Barr Labs., Inc.*, 251 F.3d 955, 58 U.S.P.Q.2d 1869 (Fed. Cir. 2001). Whether the claims of the '378 application encompass (i.e., dominate) claims of the present invention is not relevant to a determination regarding nonstatutory double patenting. Nonstatutory double patenting requires that the claims are anticipated or obvious based on claims in a commonly owned patent. In this case, the rejection is inappropriate because the claims of application Serial No. 10/068,378 do not require or suggest the claimed subject matter of claim 19 of the present application. In particular, claims in the '378 application do not suggest a compound that is comprised of dendritic polymer moieties linked to one another by moieties having alternating conjugated double and triple bonds, but instead only discloses dendritic polymers that are not linked to one another. Further, the claims of the '378 application do not require or suggest dendritic polymer moieties

having at least two different types of reactive end-groups. For these reasons, the pending claims are neither anticipated by nor obvious based on the claims of the '378 application.

Allowed Subject Matter

Applicants acknowledge that claims 13-16 and 18 are allowed.

Applicants further acknowledge that the Examiner has stated (Item 6, page 4 of the Office Action) that the prior art does not describe the compounds of this application "which are comprised of a dendritic polymer core having at least two different types of reactant end-groups some of which end-groups are attached to diacetylene-containing moieties having sensory groups attached [Fig.3]."

While Applicants agree that the prior art does not describe the claimed subject matter, Applicants disagree with the Examiner's characterization of the invention as comprising a "dendritic polymer core." Rather, the invention is a compound comprised of a plurality of dendritic polymer moieties (which were dendritic polymers before they reacted with other) that are linked to each other by moieties having alternating double and triple bonds. When diacetylene moieties react with each other as shown in Figure 1, the resulting chemical structure is no longer comprised of diacetylene moieties, but instead has alternating conjugated double and triple bonds.

CONCLUSION

In view of the above remarks, it is respectfully submitted that the application is in condition for allowance and notice of the same is earnestly solicited.

Respectfully submitted,

April 27, 2006
Date

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